RE-ENGINEERING THE MULTIMISSION COMMAND SYSTEM A-I' THE JET PROPULSION LABORATORY

SCOTT ALEXANDER
JEFF BIESIADECKI
NAGIN COX
SUSAN MURPHY (Contact)
TIM REEVE

Operation 1 Engineering Lab
Space Flight Operations Section
Jet Propulsion Laboratory, MS 301-345
California Institute of Technology
4800 Oak Grove Drive
Pasadena, California 91109-8099"
(818) 354-1948
FAX:(818) 393-4100
susan@natasha.jpl.nasa.gov

The Operations Engineering Lab (OEL) at JPL. has developed the multimission Command Subsystem as part of JPL's Multimission Ground Data System (MGDS). The Command Subsystem provides an advanced multimission environment for secure, concurrent commanding of multiple spacecraft. Its mission-independent architecture has allowed easy adaptation to new flight projects and the system currently supports all JPL. planetary missions (Voyager, Galileo, Magellan, Ulysses, Mars Observer, MESUR, and CASSINI).

The command functions include real-time command generation, command translation and radiation, status reporting, remote control of Deep Space Network antenna functions, and command file management. A distributed network-based graphical interface is provided to give real-time command radiation status to users at remote, sites. The command graphical user interface was implemented in X/Motif. The command system provides security functions including authentication for different user privilege levels, internal security checks, a remote central node for controlling all command radiation processing, and a configuration management environment for command files. This paper will discuss the design and implementation of the command software, especially trade-offs and lessons learned from practical operational use.

The lessons learned have resulted in a re-engineering of the command system, especial 1 y in its user interface and new automation capabilities. The redesign has allowed streamlining of command operations with significant improvements in productivity and case of use.. In addition, the new system has provided command capabilities that work equally well for real-time operations and within a spacecraft flight testbed. 'I'his paper will also discuss new development work including a multimission command database. toolkit, a universal command translator for sequencing and real-time commands, and the incorporation of CCSDS telecommand standards into command software for new missions.